

1) Simplifica:

a) $\frac{x^5 + 6x^4 + 9x^3}{x^3 + 3x^2}$

b) $\frac{x^3 - x}{x^3 + 3x^2 + 2x}$

c) $\frac{x^3 - 3x^2 + 3x - 1}{x^3 - 2x^2 + x}$

2) Realiza las siguientes operaciones y simplifica:

a) $\left(\frac{3}{x} - \frac{2x}{x+1} \right) \cdot \frac{x^2 + x}{x-1}$

b) $\frac{(x-1)^2}{2} \cdot \frac{1}{x^2-1} - \frac{3x}{(x+1)^2}$

SOLUCIONES

1.-

$$\text{a)} \frac{x^5 + 6x^4 + 9x^3}{x^3 + 3x^2} = \frac{x^3(x^2 + 6x + 9)}{x^2(x+3)} = \frac{x^3(x+3)^2}{x^2(x+3)} = x(x+3) = x^2 + 3x$$

$$\text{b)} \frac{x^3 - x}{x^3 + 3x^2 + 2x} = \frac{x(x^2 - 1)}{x(x^2 + 3x + 2)} = \frac{x(x-1)(x+1)}{x(x+1)(x+2)} = \frac{x-1}{x+2}$$

$$\text{c)} \frac{x^3 - 3x^2 + 3x - 1}{x^3 - 2x^2 + x} = \frac{(x-1)^3}{x(x-1)} = \frac{x-1}{x}$$

2.-

$$\begin{aligned} \text{a)} \quad & \left(\frac{3}{x} \cdot \frac{2x}{x+1} \right) \cdot \frac{x^2 + x}{x-1} = \frac{3(x+1) - 2x^2}{x(x+1)} \cdot \frac{x^2 + x}{x-1} = \\ & = \frac{3x + 3 - 2x^2}{x(x+1)} \cdot \frac{x(x+1)}{x-1} = \frac{-2x^2 + 3x + 3}{x-1} \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & \frac{(x-1)^2}{2} \cdot \frac{1}{x^2 - 1} - \frac{3x}{(x+1)^2} = \frac{(x-1)^2}{2(x-1)(x+1)} - \frac{3x}{(x+1)^2} = \\ & = \frac{x-1}{2(x+1)} - \frac{3x}{(x+1)^2} = \frac{x^2 - 1 - 6x}{2(x+1)^2} = \frac{x^2 - 6x - 1}{2(x+1)^2} \end{aligned}$$